

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First

Named

Inventor: Stephen A. Boppart

Serial No.: 10/717,437

Group Art Unit No. 3737

Filing

Date: November 19, 2003

Examiner Joel Lamprecht

Title: Nonlinear Interferometric
Vibrational Imaging

Confirmation No. 6997

INFORMATION DISCLOSURE STATEMENT

M.S. – Amendment

Commissioner for Patents

P.O. Box 1450

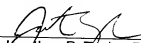
Alexandria, VA 22313-1450

Dear Sir:

In accordance with the provisions of 37 C.F.R. § 1.56, Applicants request that citation and examination of the references identified on the attached Form PTO-1449, required copies of which are enclosed herewith in accordance with 37 C.F.R. §1.98, be made during the course of examination of the above-referenced application for United States Letters Patent.

References X127, X153, X157-X159, X174-X179 and X184-X196 were originally submitted in the Information Disclosure Statement filed February 27, 2007; however, the copies of these references were not legible, or were missing, due to an inadvertent error. Copies of these references are being submitted with this Information Disclosure Statement.

Respectfully submitted,



Jonathan P. Taylor, Ph.D.
Registration No. 48,338

Customer No. 43320
Evan Law Group, LLC
600 West Jackson
Suite 625
Chicago, IL 60661
(312) 876-1400

First Named Inventor:
Stephen A. Boppart**INFORMATION DISCLOSURE CITATION**

(Use several sheets if necessary)

Filing Date:
November 19, 2003Group:
3737**U.S. PATENT DOCUMENTS**

Examiner Initials*		Document Number	Date	Name	Class	Subclass	Filing Date if Appropriate
	Z58	6,825,928 B2	11/2004	Liu et al.			
	Z59	6,564,087 B1	05/2003	Pitris et al.			
	Z60	6,574,401 B2	06/2003	Neuberger et al.			
	Z61	6,584,335 B1	06/2003	Haar et al.			
	Z62	6,839,586 B2	01/2005	Webb			
	Z63	2003/0045798 A1	03/2003	Hular et al.			
	Z64	2004/0249268 A1	12/2004	Da Silva			
	Z65	2005/0004453 A1	01/2005	Tearney et al.			
	Z66	6,485,413 B1	11/2002	Boppart et al.			
	Z67	6,363,163 B1	03/2002	Xu et al.			
	Z69	2006/0192969 A1	08/2006	Marks et al.			
	Z70	2006/0285635 A1	12/2006	Boppart et al.			
	Z71	2005/0171433 A1	08/2005	Boppart et al.			
	Z72	6,795,777 B1	09/2004	Scully et al.			
	Z73	6,159,445	12/2000	Klaveness et al.			
	Z74	2002/0028993 A1	03/2002	Hainfeld			
	Z75	2002/0087071 A1	07/2002	Schmitz et al.			
	Z76	2003/0082104 A1	05/2003	Mertelmeier			
	Z77	2004/0023415 A1	02/2004	Sokolov et al.			
	Z78	2004/0024307 A1	02/2004	Golman et al.			
	Z79	2005/0149002 A1	07/2005	Wang et al.			
	Z80	2006/0292839 A1	12/2006	Yi et al.			

FOREIGN PATENT DOCUMENTS

Examiner Initials*		Document Number	Date	Country	Class	Subclass	Translation	
	Y1	WO 00/42906	07/2000	WO			Yes	No
	Y2	WO 07/027194	03/2007	WO				

OTHER ITEMS - NON PATENT LITERATURE DOCUMENTS

Include, as applicable: Author, Title, Date, Publisher, Edition or Volume, Pertinent Pages

Examiner Initials*		
X127	Sadler et al., "Spherical ensembles of gold nanoparticles on silica: electrostatic and size effects", Chem. Commun., 1604-05, 2002.	
X153	Tearney et al., "High-Speed Phase- and Group-Delay Scanning with a Grating-Based Phase Control Delay Line", Optics Letters, vol. 22, no. 23 :1811-1813, 1997.	

Examiner

Date Considered

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Form PTO-1449 (Rev. 8-88)	Attorney Docket No. ILL09-004-US	Serial No. 10/717,437
First Named Inventor: Stephen A. Boppart		
Filing Date: November 19, 2003		Group: 3737

INFORMATION DISCLOSURE CITATION
(Use several sheets if necessary)

Examiner Initials*	OTHER ITEMS - NON PATENT LITERATURE DOCUMENTS Include, as applicable: Author, Title, Date, Publisher, Edition or Volume, Pertinent Pages
X157	Templeton et al., "Monolayer-protected cluster molecules", Acc. Chem. Res., 33:27-36, 2000.
X158	Timmerman et al., "Resorcinarenes" Tetrahedron, 52:2663-704, 1996.
X159	Tkachenko et al., "Multifunctional Gold Nanoparticle-Peptide Complexes for Nuclear Targeting", J. Am. Chem. Soc., 125:4700-4701, 2003.
X174	Wang et al., "Use of a Laser Beam with an Oblique Angle of Incidence to Measure the Reduced Scattering Coefficient of a Turbid Medium", Applied Optics, 34:2362-2366, 1995.
X175	Webb et al., "Sonochemically produced fluorocarbon microspheres: a new class of magnetic resonance imaging agent", J. Magnetic Resonance Imaging, 6:675-683, 1996.
X176	Wei et al., "Resorcinarene-encapsulated nanoparticles: building blocks for self-assembled nanostructures", J. Inclusion Phenomena Macroscopic Chemistry, 41, 83-86, 2001.
X177	Wei et al., "Synthesis and Characterization of Resorcinarene-Encapsulated Nanoparticles", Mater. Res. Soc., Symp. Proc. Ser., 581:59-63, 1999.
X178	Wei et al., "Tunable Surface-Enhanced Raman Scattering from Large Gold Nanoparticle Arrays", ChemPhysChem., 2:743-45, 2001.
X179	Wong et al., "Sonochemically produced hemoglobin microbubbles", Mat. Res. Soc. Symp. Proc., 372:89-94, 1995.
X184	Zaheer et al., "In vivo near-infrared fluorescence imaging of osteoblastic activity", Nature Biotechnology, 19:1148-54, 2001.
X185	Marks et al., "Interferometric differentiation between resonant Coherent Anti-Stokes Raman Scattering and nonresonant four-wave-mixing processes", arXiv:physics/0403007, pp. 1-8, 2004.
X186	Vinegoni et al., "Nonlinear optical contrast enhancement for optical coherence tomography", Optics Express, Vol. 12, no. 2, p. 331-341, 2004.
X187	Kee et al., "Simple approach to one-laser, broadband coherent anti-Stokes Raman scattering microscopy", Optics Letters, Vol. 29, No. 23, p. 2701-2703, 2004.
X188	Kano et al., "Vibrationally resonant imaging of a single living cell by supercontinuum-based multiplex coherent anti-Stokes Raman scattering microspectroscopy", Optics Express, Vol. 13, Issue 4, pp. 1322-1327, 2005.
X189	Gao et al., "Formulation, Characterization, and Sensing Applications of Transparent Poly(vinyl alcohol)-Polyelectrolyte Blends", Chem. Mater., 10, pp. 2481-2489, 1998.
X190	Marks et al., "Molecular Species Sensitive Optical Coherence Tomography Using Coherent Anti-Stokes Raman Scattering Spectroscopy", Coherence Domain Optical Methods and Optical Coherence Tomography In Biomedicine VII, Proceedings of SPIE, Vol. 4956, pp. 9-13, 2003.
X191	Bredfeldt et al., "Non-linear interferometric vibrational imaging", Conference on Lasers and Electro-optics, CLEO '03, pp. 309-311, 2003.
X192	Vinegoni et al., "Nonlinear optical contrast enhancement for optical coherence tomography", http://www.arxiv.org/abs/physics/0312114 , 13 pages (2003)
X193	Zumbusch et al., "Three-dimensional vibrational imaging by coherent anti-Stokes Raman scattering", Phys. Rev. Lett., 82(20), pp. 4142-4145, 1999.

Examiner	Date Considered
----------	-----------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609 Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Form PTO-1449 (Rev. 8-88)	Attorney Docket No. ILL09-004-US	Serial No. 10/717,437
INFORMATION DISCLOSURE CITATION (Use several sheets if necessary)	First Named Inventor: Stephen A. Boppart	
	Filing Date: November 19, 2003	Group: 3737

Examiner Initials*	OTHER ITEMS - NON PATENT LITERATURE DOCUMENTS Include, as applicable: Author, Title, Date, Publisher, Edition or Volume, Pertinent Pages
X194	Cheng et al., "An epi-detected coherent anti-Stokes Raman scattering (E-CARS) microscope with high spectral resolution and high sensitivity", J. Phys. Chem., 105(7), pp. 1277-1280, 2001.
X195	Hashimoto et al., "Molecular vibration imaging in the fingerprint region by use of coherent anti-Stokes Raman scattering microscopy with a collinear configuration", Opt. Lett., 25(24), pp. 1768-1770, 2000.
X196	Volkmer et al., "Vibrational imaging with high sensitivity via epidected coherent anti-Stokes Raman scattering microscopy", Phys. Rev. Lett., 87(2):023901-1-4, 2001.
X197	Schmitt et al., "Optical-coherence tomography of a dense tissue: statistics of attenuation and backscattering", Phys. Med. Biol., vol. 39, pp. 1705-1720, (1994).
X198	Tearney et al., "In vivo endoscopic optical biopsy with optical coherence tomography", Science, vol. 276, pp. 2037-2039, (1997).
X199	Fantini et al., "Assessment of the size, position, and optical properties of breast tumors in vivo by noninvasive optical methods", Applied Optics, vol. 37, pp. 1982-1989, 1998.
X200	Faber et al., "Quantitative measurement of attenuation coefficients of weakly scattering media using optical coherence tomography", Optics Express, 12(19), pp. 4353-4365, 2004.
X201	Fujimoto et al., "Optical Coherence Tomography: An Emerging Technology for Biomedical Imaging and Optical Biopsy", Neoplasia, 2(1-2), pp. 9-25, 2000.
X202	Zysk et al., "Computational methods for analysis of human breast tumor tissue in optical coherence tomography images", Journal of Biomedical Optics, 11(5), 054015-1 - 054015-7, 2006.
X203	Levitz et al., "Determination of optical scattering properties of highly-scattering media in optical coherence tomography images", Optics Express, 12(2), pp. 249-259, 2004.
X204	Morgner et al., "Spectroscopic optical coherence tomography", Optics Letters, 25(2), pp., 111-113, 2000.
X205	Gossage et al., "Texture analysis of optical coherence tomography images: feasibility for tissue classification", Journal of Biomedical Optics, 8(3), pp. 570-575, 2003.
X207	Zvyagin et al., "Refractive index tomography of turbid media by bifocal optical coherence refractometry", Optics Express, 11(25), pp. 3503-3517, 2003.
X208	Gottschalk, "Ein Meßverfahren zur Bestimmung der optischen Parameter biologischer Gewebe in vitro", Dissertation 93 HA 8984, Universität Fridericiana Karlsruhe, 1993.
X209	Bolin, F.P. et al., "Refractive index of some mammalian tissues using a fiber optic cladding method", Applied Optics, 28, pp. 2297-2303, 1989.
X210	Tearney et al., "Determination of the refractive index of highly scattering human tissue by optical coherence tomography", Optics Letters, 20(21), pp. 2258-2260, 1995.
X211	Zysk et al., "Needle-based refractive index measurement using low-coherence interferometry", Optics Letters, 32, pp. 385-387, 2007.
X212	Zysk et al., "Refractive index of carcinogen-induced rat mammary tumours", Phys. Med. Biol., 51, pp. 2165-2177, 2006.
X213	Li et al., "Measurement method of the refractive index of biotissue by total internal reflection", Applied Optics, 35, pp.1793-1795, 1996.

Examiner	Date Considered
----------	-----------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Form PTO-1449 (Rev. 8-88)	Attorney Docket No. ILL09-004-US	Serial No. 10/717,437
First Named Inventor: Stephen A. Boppert		
Filing Date: November 19, 2003		Group: 3737

INFORMATION DISCLOSURE CITATION
(Use several sheets if necessary)

Examiner Initials*	OTHER ITEMS - NON PATENT LITERATURE DOCUMENTS Include, as applicable: Author, Title, Date, Publisher, Edition or Volume, Pertinent Pages
X214	Knuttel et al., "Spatially confined and temporally resolved refractive index and scattering evaluation in human skin performed with optical coherence tomography", Journal of Biomedical Optics, 5, pp. 83-92, 2000.
X215	Boppert et al., "Optical coherence tomography: feasibility for basic research and image-guided surgery of breast cancer", Breast Cancer Research and Treatment, vol. 84, pp. 85-97, 2004.
X216	Liberman et al., "Palpable breast masses: Is there a role for percutaneous image-guided core biopsy?", American Journal of Roentgenology, vol. 175, pp. 779-787, 2000.
X217	Bolivar et al., "Stereotaxic core needle aspiration biopsy with multiple passes in nonpalpable breast lesions", Acta Radiologica, vol. 39, pp. 389-394, 1998.
X218	Acheson et al., "Histologic correlation of image-guided core biopsy with excisional biopsy of nonpalpable breast lesions", Archives of Surgery, vol. 132, pp. 815-821, 1997.
X219	Pijnappel et al., "The diagnostic accuracy of core biopsy in palpable and non-palpable breast lesions", European Journal of Radiology, vol. 24, pp. 120-123, 1997.
X220	Durduran et al., "Bulk optical properties of healthy female breast tissue", Physics in Medicine and Biology, vol. 47, pp. 2847-2861, 2002.
X221	International Search Report dated February 15, 2007 for International Application No. PCT/US2006/006618, 5 pages.
X222	Marks et al., "Interferometric differentiation between resonant coherent anti-Stokes Raman scattering and nonresonant four-wave-mixing processes", Applied Physics Letters, Vol. 85, No. 23, pp. 5787-5789, 2004.
X223	Marks et al., "Nonlinear Interferometric Vibrational Imaging", Physical Review Letters, Vol. 92, No. 12, pp. 123905-1 - 123905-4, 2004.
X224	Boppert et al., "Contrast Enhancement Methods for Optical Coherence Tomography", Biophotonics/Optical Interconnects and VLSI Photonics/WBM Microactivities, 2004 Digest of the Leos Summer Topical Meetings, San Diego, CA, pp. 14-15, 2004.
X225	Marks et al., "Pulse Shaping Strategies for Nonlinear Interferometric Vibrational Imaging Optimized for Biomolecular Imaging", Proceedings of the 26 th Annual International Conference of the IEEE EMBS, San Francisco, CA, pp. 5300-5303, 2004.
X226	Bredfeldt et al., "Nonlinear interferometric vibrational imaging of molecular species", Proc. Of SPIE, Vol. 5321, pp. 149-156, 2004.
X227	Easy Core Biopsy System, Product Brochure, Boston Scientific, 5 pages, 2004
X228	Yodh et al., "Spectroscopy and Imaging with Diffusing Light," Physics Today, pp. 34-40, 1995.
X230	Roggan et al., in "Laser Induced Interstitial Thermotherapy", Muller, Ed., pp. 39-40,43, 1995.
X231	Ohmi et al., "In Vitro Simultaneous Measurement of Refractive Index and Thickness of Biological Tissue by the Low Coherence Interferometry", IEEE Transactions on Biomedical Engineering, Vol. 47, No. 9, pp. 1266-1270, 2000.
X233	Luo et al., "Optical Biopsy of Lymph Node Morphology using Optical Coherence Tomography", Technology in Cancer Research & Treatment, Vol. 4, No. 5, pp. 539-547, 2005.

Examiner	Date Considered
----------	-----------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Form PTO-1449 (Rev 8-88)	Attorney Docket No. ILL09-004-US	Serial No. 10/717,437
INFORMATION DISCLOSURE CITATION (Use several sheets if necessary)	First Named Inventor: Stephen A. Boppart	
	Filing Date: November 19, 2003	Group: 3737

Examiner Initials*	OTHER ITEMS - NON PATENT LITERATURE DOCUMENTS Include, as applicable: Author, Title, Date, Publisher, Edition or Volume, Pertinent Pages	
	X235	Dehghani et al., "The effects of internal refractive index variation in near-infrared optical tomography: a finite element modelling approach", Physics in Medicine and Biology, 48, pp. 2713-2727, 2003.
	X236	Schmitt et al., "Turbulent nature of refractive-index variations in biological tissue", Optics Letters, Vol. 21, No. 16, pp. 1310-1312, 1996.
	X237	Zysk et al., "Projected index computed tomography", Optics Letters, Vol. 28, No. 9, pp. 701-703, 2003.
	X238	Easy Core Biopsy System, Product Brochure, Boston Scientific, 4 pages, 2004
	X239	Evans et al., "Coherent anti-Stokes Raman scattering spectral interferometry: determination of the real and imaginary components of nonlinear susceptibility $\chi^{(3)}$ for vibrational microscopy", Optics Letters, Vol. 29, No. 24, pp. 2923-2925, 2004.
	X240	Yoon et al., "Dependence of line shapes in femtosecond broadband stimulated Raman spectroscopy on pump-probe timed delay", J Chem Phys., 122(2), p. 024505, 2005, 20 pages.
	X241	Kolomoitsev et al., "New problems of femtosecond time-domain CARS of large molecules", SPIE Vol. 1402, pp. 31-43, 1990.
	X242	Mehendale et al., "Towards an anthrax detector using the femtosecond adaptive spectroscopic technique for coherent anti-Stokes Raman Spectroscopy: coherent anti-Stokes Raman spectroscopy signal from dipicolinic acid in bacterial spores", Journal of Modern Optics, Vol. 51, pp 2645-2653, 2004.

Examiner	Date Considered
----------	-----------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.